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THE interval between the time when the ghost was referred to in whispers as a "pale shade," and that when it is coolly indexed as a "telepathic hallucination" has been prolonged and perilous. Nothing could have seemed more likely than that a being of such notoriously fragile tissue should have failed altogether to survive its various ordeals of neglect, scepticism, and, finally, determined investigation. For those, therefore, who have had, throughout, the courage of their credulity, there is profound satisfaction in the permanent scientific footing upon which the ghost may now be regarded as having placed itself.

When ghosts were in their heyday, mortal beings did their part in supplying suitable accessories. Isolated chambers and unlighted, draughty corridors were the accustomed setting. But such unambiguous additions to interior furnishing as electric lights and steam heat, beyond being a menace to apparitions in general, did away, one cannot but believe, with certain of the more sensitive and timid wraiths. The tendency in this country to tear down old dwellings and to remodel others, the craze for light and air and sanitation, must have been extremely prejudicial. The superficial enthusiasm for "science" involved a passionate, if ignorant, hostility to the unexplained. Indeed, there came a period when, because of these many discouraging influences, the ghost was probably in lower repute than at any time during the history of the world. Moreover, the widespread vogue of Spiritualism, both in this country and in England, had vulgarized the subject, inasmuch as the induced or manufactured ghost has never had the enthralling attributes of the spontaneous phenomenon, and belongs, of course, in an entirely different category. Spectres were, therefore, taboo in general conversation; and although the practice of "telling ghost stories" was still occasionally followed, these were always tagged with some unimaginative materialistic explanation, involving the blowing of a curtain or the rattling of a shutter. Those who really knew can scarcely have been affected by the prevailing scepticism, but they had their reputations for sanity to maintain and kept silent. Meanwhile, story-writers, faithfully reflecting the sentiment of their period, forbore mention of the phantasmal, or, where they failed to, publishers rigidly excluded material that they classed as obsolete.

But at that very moment the rehabilitation of the ghost was under way. The Society for Psychical Research in England had already begun its investigations, the fruit of which was to take shape as some of the most remarkable literature in the language; literature which now stands readily accessible to the perversely uninformed. Because of the personal distinction of this early group of ghost-

hunters, which included, as everybody knows, Professor Sidgwick, Mr. Edmund Gurney, and the brilliant Mr. Frederic Myers, the subject to which they devoted their intelligence and energy ceased after a time to be considered something too vulgar and puerile for mention. With noiseless but unchallenged steps the ghost emerged from its soiling and obscuring influences, passed from discredited shadow into something that was almost substance, became authentic and respectable. Ghosts from every quarter of the United Kingdom, indeed from all over the world, found their way into excellently attested print. The loose, picturesque phrases of folklore gave way to a newly contrived scientific phraseology of a curiously fascinating character. Family and local spectres took on a fresh importance. The private cult of the ghost became almost a fashion and led in turn to such associated pastimes as crystal gazing and experiments in thought-transference; and even the much-ridiculed phenomenon of "table-tipping" was again seriously countenanced.

But unfortunately for the continued prominence of the ghost, pure and simple, the rapidly accumulating evidence, not alone of apparitions, but of telepathic phenomena of various sorts, proved to be, in a sense, too convincing. To certain of the leaders in research, notably including Mr. Myers, communication between the dead and the living appeared to be an established fact. So that the securing of messages from the dead became a matter of such absorbing moment that uncommunicative, spectacular wraiths were very much subordinated. With proofs of human immortality within reach, as Mr. Myers and Mr. Gurney believed, the merely curious and mystifying was properly negligible. Interested followers of the

movement must sincerely lament this fact, not only because the study of the ghost itself fell into abeyance at a critical point, but also because of the rather pitiful result at the present day. In England, the inheritors of the movement devote themselves to securing "cross-correspondences" with mediums through whose automatic writing the supposed spirit of Mr. Myers tries to prove its identity. While in this country an intelligence allegedly belonging to the late Dr. Richard Hodgson acts as the unreliable and evasive "control" of the overworked Mrs. Piper, and the American branch of the S. P. R. is chiefly occupied with the far from dispassionate researches of the now fervent spiritist, Professor Hyslop.

Yet it may not be wholly a matter for regret that the ghost has escaped an exhaustive analysis, that its chemical formula is still unknown. We feel it right that a certain degree of enveloping mystery should be permanently conceded to the phantasmal; and even while we pursue them, we secretly hope that those pale, chilly, fleeing figures may never surrender their precious impalpabilities. We are at least deluded by no superstition, for the fact that there are ghosts—whatever be their insubstantial essence—seems as well established as the intangible can ever be. Indeed, as Professor William James has said, "those for whom the volumes of the S. P. R. Proceedings already published count for nothing would remain in their dogmatic slumber though one rose from the dead." One would suppose that absolute scepticism would be difficult to maintain after reading the two richly packed volumes of *Phantasms of the Living*, and that to one familiar with Mr. Myers's wonderful and enthralling work on *Human Personality*, such an attitude would be impossible. The fact has to be faced that the literary imagination, valiantly as it has set itself to the task, has never produced ghosts that, as compelling dramatic figures, rank with certain of those assembled in these books under the guise of statistics.

It must be taken for granted that ghosts are a permanent and ineradicable phenomenon; that they have always been seen and always will be, though possibly never again with the uncontrollable terror that their pallid masks and cryptic pantomime have formerly aroused. But if they still do manifest themselves, persistent and insatiable of life, who is it, after all—the very young or the very ignorant may ask—that sees them? Well, it may be you yourself, when the inevitable moment comes. In any event, it is certain to be some one within your familiar knowledge. To put it very loosely, it may be safely stated that one person, at least, in every family group has had a phantasmal encounter. Your neighbor may boast of the emptiness of his own experience, but if you press him he is sure to admit that his grandmother or his uncle's wife has a strange, whispered knowledge of apparitions. The S. P. R. found that 7.8 per cent. of Englishmen and 12 per cent. of Englishwomen had hallucinations, and this has since been regarded as an underestimate. It would be profoundly interesting to possess corresponding statistics regarding our own countrymen; to discover whether the ghost-seeing average is a constant quantity, and whether the more favorable conditions (of tradition, setting, and so on) that England undoubtedly affords is balanced in our own case by, perhaps, a keener psychic sensitiveness, or some such circumstance.

The idea, however, that the seeing of ghosts in general depends upon some unusual characteristic or condition in the seer is, of course, a fallacy. Nothing could be more inaccurate than to confound the inconsequential spectre with the vision of the mystic; seeing a ghost by no means implies a condition of ecstasy. It has often been taken for granted by the uninformed that if not actually the hysteric, it is at least the highly organized person, or the excessively eager ghost-fancier, who sees ghosts. On the contrary, the patient keeper of expectant vigils is rarely rewarded by as much as the teasing flutter of a ghostly garment. And if the thing is governed by any law, it is that ghosts appear by preference to persons of sound health and unimaginative temper who do not anticipate their experience. In an authentic story that stands on record, the apparition was seen by a nurse, a stolid, literal-minded young woman, professionally inured to death-beds. As her patient, a lady's maid (and a complete stranger to her) lay dying, there entered the room a ghostly figure of interesting definiteness; that of "a short, dark woman, wearing an apron with a hole in it, and carrying a brass candlestick." Though there was no



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resemblance, the nurse was convinced that the apparition was that of the patient's mother; and when, a few days later, the mother did come in the flesh to her dead daughter's funeral, the correspondence proved to be exact; even the apron and the candlestick being identified as articles of constant use by her. This, of course, was not a ghost in the usual sense, but a "phantasm of the living"; but the closeness with which it was verified makes it a serviceable text.

Nor may it be said that it is simple, untrained, easily deluded folk who bring record of ghostly experience, as is shown in the celebrated case reported by "Miss Morton," a case in which the chief percipient was surely almost as remarkable as the apparition. The ghost in this case, which was that of a woman "dressed in widow's weeds and carrying pressed to her face a handkerchief held in her right hand," was seen in all by twenty persons, by some of them several times over—an amazing case of "collective percipient," "Miss Morton," a highly intelligent and incredibly self-possessed young Englishwoman, who oftenest saw the figure, set herself to obtaining proofs

of its immateriality. She lightly fastened threads with glue across the staircase, and saw the figure pass through them. She watched it appear and disappear in a room with locked doors. She even deliberately "cornered" it, while begging it to speak; but the silent phantasm, after the immemorial manner of its kind, even then successfully evaded contact. If all phantoms had had as competent observers, the spectral tribe would be as unquestioned a fact as cabbages.

What, then, beyond being a dramatic and highly decorative feature of life, is it found that a ghost really is? Unquestionably the long-prevailing notion must be denuded of its most familiar characteristics. It is sufficiently established that the ghost is not a "supernatural visitant," a messenger from "beyond the grave." It does not come, for instance, as fiction has repeatedly represented it, to indicate buried treasure. It does not issue warning or foretell disaster. Neither does it hope to do penance; or to exact vengeance. "The authentic" ghost brings no message from the dead to the living," says the dispassionate and dependable Mr. Podmore, a statement

that of course is not intended to apply to the enormously large class of "telepathic hallucinations" that announce death and form a class by themselves.

As nearly as its baffling nature may be understood, the ghost appears to be a visual echo, a psychic shell, an attenuated astral self, a reflection, in too-sensitive ether, of a life vividly lived or agitatedly relinquished; or an undeliberate strayer-in, it may be, from the looser confines of extra-dimensional space. It is probable that Mr. Myers put it almost too strongly when he said that the ghost was a "manifestation of persistent personal energy." It seems more likely to be, as he alternately suggests, a "veridical after-image." Despite the awe that it has inspired from earliest time, it is evident that there is no need to fear it. It is as devoid of evil as of good; as innocent of purpose as of intelligence. It is useless to ask a ghost its errand. No spectre has ever answered that stammered question. Nor is it wise to suppose it moved by the emotions of which we feel the constant urge. The heart of a ghost is as shadowy a matter as the unsubstantial fabric of its cloak.

Filling a City's Drinking-Cup

HOW WORCESTER, MASSACHUSETTS, FOUGHT OFF THE PERIL OF DROUGHT

By Edward Hungerford

THE season of potential droughts is approaching. How are our cities equipped to meet a possible repetition of the weeks of grave danger which some of them encountered last summer? Let the example of Worcester, Massachusetts, be pondered while there is still ample time to profit by it. It is a story that is here told in full for the first time.

On the first day of August last, Worcester found herself confronted with a water famine. The men in charge of her reservoirs reported that less than thirty days' supply remained within them. It was a dry year—these last six years have been the drierest in the eastern part of the United States since a similar cycle in the early "eighties"—and the dry summer season was not half spent. The situation from any point of view was alarming. The citizens of Worcester were thoroughly frightened because of it.

The causes that had brought Worcester's reservoirs to such an ebb-tide are not worth recalling here. Worcester people were glad enough to forget them in their demand that immediate relief be given to the situation. Such a situation is not unusual in American towns. Many of them have faced it at one time or another. New York was confronted with a similar problem only this last summer and a vast deal of talk was wasted in arguing the matter pro and con. Worcester wasted little talk—she acted.

A great deal of money and thought has been spent in that same busy manufacturing town of eastern Massachusetts within the past dozen years in improving the mental caliber of its citizenship. Not an hour of that time, not a dollar of that money was wasted, and that was shown when the water-famine peril came upon the city. Every man in the place stood behind Mayor James Logan, its executive. The mayor's problem was not an easy one. He faced as real a crisis as had confronted the city within recent years. He quickly reduced the problem to its simplest dimensions. It was not theoretical, not social, not political—it was essentially an engineering problem.

Right there was the difficulty. The city engineer, Mr. F. A. McClure, was seriously ill, and his department was more or less demoralized, although it was making sincere efforts to remedy the situation. Mayor Logan then remembered that Charles A. Allen had an office across Front Street and he hastened over from the City Hall to see him. Mr. Allen is a native of Worcester. His memory goes back to the days when the Boston and Albany used to have its barn of a station on the town common, and that means that he has seen every step of the development of a city that has proved that it can combine intellectuality and industrialism in the highest practical degree. He was for many years the city engineer, and he knows Worcester as he knows the fingers of his right hand. It was obvious that he was the man for the situation.

For a single moment he hesitated. It was not that he had planned his annual fishing-trip up into New-foundland, to begin upon the following Saturday. But Mr. Allen has been in touch with politics and he knows some of the unreasonable demands it makes upon men who like to get at a thing with business-like directness. Any keen-witted man who has ever tried to handle any important problem in a large American town knows what those demands really are. The eight-hour law is one of the least of these.

"If I could cut the red tape," said Mr. Allen, "I should like nothing better than a job of this sort."

The Mayor of Worcester smiled upon him.

"That settles it," said he. "I'll cut the red tape."

And so he did. He went from Allen's office to that of the corporation counsel and for a little while they conferred together. When they were done Allen had his way cleared for him. Condemnation proceedings had been waived and the civil service commission was told that it must not hamper the hiring of engineers. It had also been agreed to forego the usual period of advertising that must allot the placing of contracts. Even the eight-hour law had fallen before the demands

of extreme expediency. The corporation counsel had found a kink in it which permitted a city in just such a fix as Worcester found herself to waive its most stringent provisions.

It was Saturday, August 12th, when Mr. Allen found himself in command of the situation, his hands cut free from the red tape, a big town willing to help him in every possible way. His first step was decisive. Worcester, like almost every other city built both on high hills and in the deep valleys between them, had a double water-service—a high service and a low. There was an altitude difference of 580 feet between the extremes reached by both, although it was possible to supply the highest floor of the highest building in the place, under ordinary conditions, without pumping. The gravity system ordinarily sufficed. But these were extraordinary conditions, and Mr. Allen recognized them by ordering all the water turned into the high-service pipes. That was a good idea, for the low-service mains were bound to have water available as long as there was a supply in the high service. It was not only a good idea but it was simple, one of those plans whose very simplicity has kept it from immediate notice and adoption.

On Monday, the fourteenth, Mr. Allen had completed his plans. His detailed knowledge of the vicinity of Worcester had proved invaluable. He had looked to the northeast, across the green Massachusetts hills, down into the Wachusett Lake reservoir, a part of the metropolitan district's water supply. You must know now that the Metropolitan Water Board is a State commission of Massachusetts appointed to settle the water needs of the great congested district of cities and towns within twenty miles of the gilded dome of the Bulfinch State House on Beacon Hill, Boston. These cities and towns had quarreled among themselves about water supply. Each was rather intent on preserving his own supply fresh and abundant and letting the other fellows go without. Out of their constant quarrels came the Metropolitan Water Board with absolute power to regulate the entire situation. It hired expert engineers, and then, acting upon their recommendations, it went fifty or sixty miles inland in Massachusetts to the very crests of the hills that divide the watershed of the Connecticut Valley from that of the Atlantic Coast. There was pure water in abundance there, and Boston and the towns round about her could have it by paying for it to the State, at fixed rates for every gallon used.

So it was that the Wachusett Lake reservoir was immediately available for Worcester, and Mr. Allen's problem consisted chiefly of bringing the needed water down into the heart of the town. He turned his attention to the high-service mains. He found that some of these reached the suburban addition of Summit, a little station on the Boston and Maine on the northern edge of the city. He then planned to pump to that point from Wachusett Lake not more than three miles distant.

But to pump water an engineer must have an aqueduct of some sort, and inasmuch as this Wachusett Lake reservoir may be in use for three or four years—until Worcester's permanent relief plans are ready—such an aqueduct must have some permanence of itself. Pipe was the most practical form of aqueduct, even though pipe demands being buried against the freezing rigor of New-England winters. So the man in charge of the situation chose a pipe thirty inches in diameter, for the rather fundamental reason that he could find a large stock of that very size of tubing at Burlington, New Jersey.

The best part of engineering is that which forms a close co-partnership with ordinary common-sense. Mr. Allen must have had the New England predilection for that very sort of partnership, for not only did he locate his pipes and his pumping machinery as fast as the telegraph could speed from one manufacturer to another, but he chose the route of his new pipe line so as to avoid condemnation proceedings wherever possible. That meant routing the new pipe line for the greater part of the way down a lazy country road leading from Summit to Wachusett Lake. At some points, however, it was necessary to cut corners on

private property, and at one of these points a native son of New England raised a protest.

"Nothing doing here," he said, as if water famines in towns of 150,000 population were everyday happenings. "It'll cut across the missus's garden and she won't stand for it."

But Allen is a diplomat, and before he had left the farmer that afternoon the latter had seen the error of his ways—aided by a few dollars and the promise of a two-months' job with his team on the new work. You can cut across corners with more things than mere aqueducts.

With the pipe line placed and three gangs working simultaneously upon it, Worcester's emergency man turned his attention to his improvised pumping station. A firm of Boston contractors who have earned a reputation for doing work on close schedule came to his aid. That firm had a chain of branch offices across the land, and through them it began its hunt for a set of pumps for Eagle Lake—of which more in a moment—and for the emergency station at Wachusett Lake. For that last station five great pumps with a combined capacity of ten million gallons a day were secured from a manufacturer's store-room.

Finally there came the question of power for these pumps. On that point Worcester was fortunate. Power-transmission lines are becoming almost as common as the telegraph throughout New England and one of the biggest of these—bringing electricity from the Connecticut River all the way down into Boston—crossed within half a mile of the new pumping station.

Then came the gravest question of all—the problem of generators for transforming that electricity into the energy to send those pumps spinning at 1,200 revolutions a minute. You can buy cast-iron pipe and even sometimes pumps ready-made in an emergency, but electrical equipment is another matter, particularly when you are rigging up 1,250 horse-power within a dozen weeks. That was the final test that came to the Boston concern, but within forty-eight hours it had whispered the name of a Fitchburg mill-owner into Mr. Allen's ear, and he was at the long-distance telephone asking the mill-owner if he would do the city of Worcester the courtesy of permitting it to use those newly completed generators. The mill-owner said that he would.

Big business may be as wicked as it is painted in some places, but Worcester believes that they are well without its boundaries. A mill concern with a private reservoir up on Pine Hill came forward at the beginning of the scare and said that the town could have all the water in its impoundings. When the Eagle Lake supply was brought into play as a second emergency supply the trolley road discovered that it had an abandoned power-house at the edge of the pond which Worcester was welcome to use. Valuable hours were saved by it, for the engineers were able to move boilers and pumps into it from a nearby manufacturer's store-house.

Pine Hill was the first of these emergency supplies to be tapped. If it was only a drop in Worcester's cup it came quickly, and Worcester was drinking it by August 20th. Two weeks later the Eagle Lake relief was also cut into the mains, a wooden sluiceway having been hastily erected. These two plants carried the city on a narrow water-margin while the triple gang worked unceasingly on the more ambitious conduit from the practically inexhaustible Wachusett Lake supply.

Six hundred feet a day of finished conduit was the rule laid down by Allen when he had promised Worcester that after a dozen short weeks its cup of water should never be in danger of going empty. The conduit went in place without delay, the city kept tightly to its word about the cutting of the red tape, and Allen found himself a week ahead of his close schedule when the job was done. In nine weeks from the time the contract was let the plant was ready for test-pumping, in eleven weeks it was delivering a fast-moving stream of water as big around as a man's body at the high level of the Worcester service pipes, and all American records for quick municipal engineering had gone to smash.